Learning Goals

What We Know...

Factored Form - y = a(x - s)(x - r)
How to FACTOR (from standard form)
Can find ZEROS

Students will learn...

What it means to SOLVE a quadratic

Feb 22-11:43 AM

Unit 6: Quadratic Equations

Quadratic ***relation***: $y = x^2 + 5x + 6$ ***refers to every point on the parabola

Quadratic ***equation***: $0 = x^2 + 5x + 6$ ***refers to specific point(s) on the parabola

Zeros: x-intercepts of a quadratic relation (i.e. refers to the graph).

Roots: the solution(s) to a quadratic equation. The value of the variable that makes the equation true (LS = RS).

May 10-10:20 AM

(6.1) Solving Quadratic Equations

When a quadratic equation can be solved by factoring:

Edit Reset ?

1. Replace y with the given value.
2. Rearrange to ax^2 + bx + c = 0 form.
3. Factor (if possible).
4. Set each factor =0 ("branch off").
5. Solve to find the roots.

What if it can't be factored?

May 10-10:37 AM

Examples:

1) Find the roots.

a) $0 = 9x^2 - 30x + 25$

b) $3x(x + 6) + 50 = 2x^2 + 3(x - 2)$

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Examples:

1) Find the roots.

a) $0 = 9x^2 - 30x + 25$

$3x \cdot 5 \times 2 = 30x$ ∴ perfect square

$(3x - 5)^2 = 0$ $\left(+\frac{5}{3}, 0\right)$

b) $3x(x + 6) + 50 = 2x^2 + 3(x - 2)$

$3x^2 + 18x + 50 = 2x^2 + 3x - 6$

$3x^2 - 2x^2 + 18x - 3x + 50 + 6 = 0$

$x^2 + 15x + 56 = 0$

A | M
+15 | +56
+7 + 8

$(x + 7)(x + 8) = 0$

$(-7, 0)$ $(-8, 0)$

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2. Determine the values of x that satisfy the relation $y = x^2 - 4x - 10$ when $y = 11$.

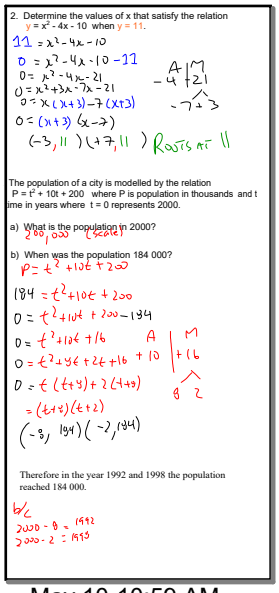
The population of a city is modelled by the relation $P = t^2 + 10t + 200$ where P is population in thousands and t time in years where t = 0 represents 2000.

a) What is the population in 2000?

b) When was the population 184 000?

Therefore in the year 1992 and 1998 the population reached 184 000.

May 10-10:59 AM



2. Determine the values of x that satisfy the relation $y = x^2 - 4x - 10$ when $y = 11$.

$11 = x^2 - 4x - 10$

$0 = x^2 - 4x - 10 - 11$

$0 = x^2 - 4x - 21$

$0 = x^2 + 3x - 7x - 21$

$0 = x(x+3) - 7(x+3)$

$0 = (x+3)(x-7)$

$(-3, 11)$ $(7, 11)$ Roots at 11

A | M

$-4 \quad +21$

$-7 \quad -3$

The population of a city is modelled by the relation $P = t^2 + 10t + 200$ where P is population in thousands and t ime in years where t = 0 represents 2000.

a) What is the population in 2000?

200,000 (scale)

b) When was the population 184 000?

$P = t^2 + 10t + 200$

$184 = t^2 + 10t + 200$

$0 = t^2 + 10t + 200 - 184$

$0 = t^2 + 10t + 16$

A | M

$+10 \quad +16$

8 2

$0 = t^2 + 8t + 2t + 16$

$0 = t(t+8) + 2(t+8)$

$= (t+8)(t+2)$

$(-8, 184)(-2, 184)$

Therefore in the year 1992 and 1998 the population reached 184 000.

b/c

$2000 - 8 = 1992$

$2000 - 2 = 1998$

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Homework

Pg. 320 # 4 - 8aef, 9c, 10, 11, 13

May 7-7:22 AM